JANUARY 1963

Communication HORIZONS

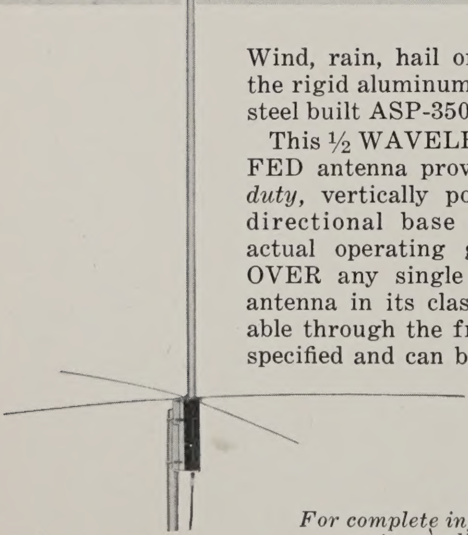
C.D./M.T.P.

— page 4

ONLY $34⁵⁰ to beat the wind·rain·snow!

ASP-350
(30-50 Mc)*

the antenna specialists brand base antenna



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This ½ WAVELENGTH END-FED antenna provides a *heavy-duty,* vertically polarized omni-directional base station. The actual operating gain is 6 db OVER any single element type antenna in its class. It's adjustable through the frequency band specified and can be tuned easily to operating frequency in the field.

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For all-weather dependability at low-cost, the ASP-350 has proven itself to be the best. *Also in 40-50 Mc (ASPA 350).

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AND WHAT'S HAPPENING WITH YOU THESE DAYS?

For months now, we here at COMMUNICATION HORIZONS have been telling you what we are up to. Now, we'd like to know what's going on in **your** shop. What are your current problems? What tricky jobs have you accomplished lately? **What's new?**

We ask this for two reasons. One, if you tell us what **you** are doing then we will be able to better serve you by bringing you the information you need. And two, **your** activities, problems, and accomplishments may be news in themselves, helping other people in the industry.

To make it easy for you, we've prepared the card below. Just fill in any of the blanks which may be appropriate, drop it in an envelope, and airmail it to Communication Horizons, P. O. Box 1557, Oklahoma City 1, Oklahoma. Today is the day to do it!

Communication report for the period ______________________ to ______________________.

New personnel in period: ____

New test equipment installed: ____

New antennas installed: ____

New mobile units installed: ____

New base stations installed: ____

New repeaters installed: ____

New systems installed: ____

Current problems: ____

Plans for next 30 days: ____

From: Firm: ____

Location: ____

Signed: ____

Date: ____

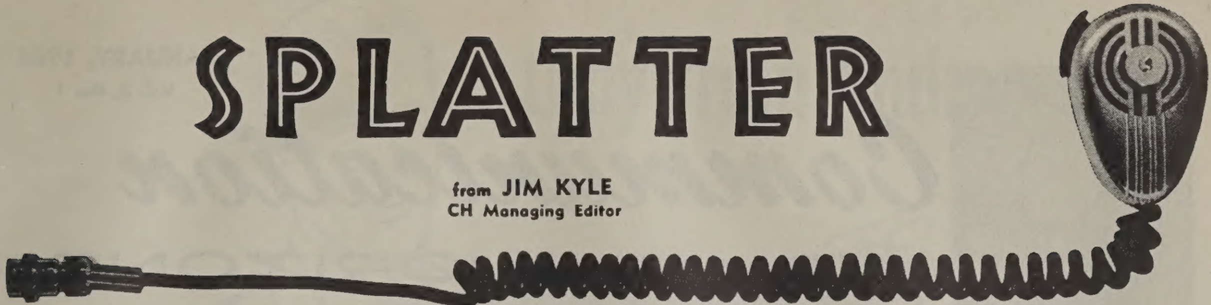
NEWS . . . on many fronts of the non-broadcast industry!

During the coming months, the non-broadcast radio industry is expecting to make news on many fronts. Not the least of these is the action to achieve an additional 240 channels of spectrum space by requesting reallocation of UHF TV channels 14 and 15. Technically, too, a number of newsbreaks are being anticipated.

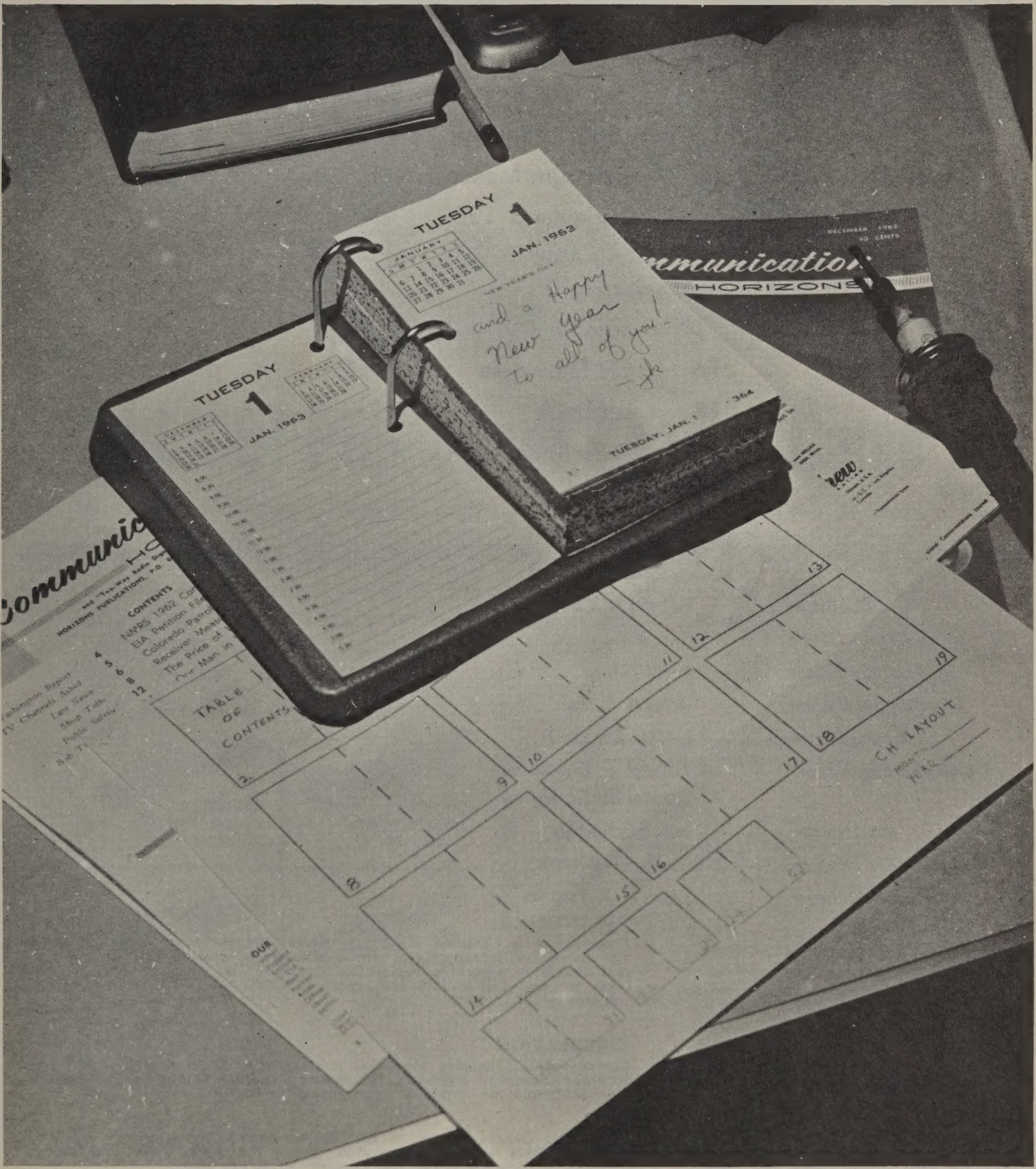
Whatever the event — either technical or administrative — you can count on coverage in depth by the CH team. Washington Bureau Chief Bob Tall, Public Safety Contributing Editor Robert Brooking, Service Editor Kay Reed, and the rest of us here in the main office work around the clock with a single purpose in mind — to keep YOU informed of the latest events in the communication world.

But to keep informed, you must act as well. All our work goes for naught if you don't get an opportunity to read the result. And the way to make sure you have this opportunity is to make sure, today, that you're on our list of subscribers. Are you there? If not, turn the page, fill out the form, and airmail it right now. Speed pays! And then, for the next 12 to 15 months depending on how fast you act, you'll have all of us working for you — and you'll keep up with the news in COMMUNICATION HORIZONS.

SPLATTER



from JIM KYLE
CH Managing Editor



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CONTENTS

System Examination **4** C. D. / M. T. P.
Product Information **6** "Service Shop in a Box"
Public Safety **10** 1962 in Review
The Legal Spectrum **12** Spectrum Management
Special Report **13** Disneyland 1962
Bob Tall Reports **16** Our Man in Washington

DEPARTMENTS

1 Splatter
14 CH Showcase
18 Logbook
20 Milestones

Publisher Robert B. Cooper
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OUR COVER:

The CD emblem is familiar to most of us — and the convenience of "matching funds" is also familiar. But **not** so familiar is the fact that a system designed to CD standards can produce top performance. Oklahoma's Pete Howard has learned this—a complete story on his spectacular system begins on page 4.

ADVERTISING

Communication Horizons Magazine accepts commercial display advertising from bona fide manufacturers and distributors of communications equipment and associated apparatus. Advertising rate card and coverage data available upon request. Call collect area code 405 CEntral 2-1108 for advertising information.

CIRCULATION

Communication Horizons Magazine is read monthly by nearly 10,000 two-way communication engineers, technicians, installers and users. Detailed circulation breakdown available upon request.

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Here is the new copper Foam HELIAX "ready to install" cable kit that offers electrical superiority at no premium in price. Foam HELIAX is available in ½ and ⅞ inch diameters, cut to your specific length, with end fittings factory attached.

Unique corrugated design of the copper outer conductor permits Foam HELIAX to be pulled through conduit and around obstacles in applications where smooth wall cable could not be installed.

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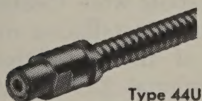
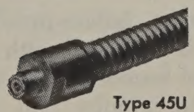
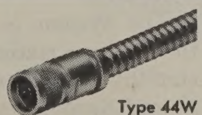


Type 44U
Type UHF jack for
½" Foam Heliax

Type 44P
Type UHF plug for
½" Foam Heliax



Type 45U
Type UHF jack for
⅞" Foam Heliax



Type 44W
Type N jack for
½" Foam Heliax

Complete specifications on Foam HELIAX available in Andrew Bulletin 8484. Write,

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C.D./M.T.P.

(Civil Defense Means Top Performance)

The highway department engineer driving down Interstate 35 northeast of Oklahoma City picked up the microphone of his mobile unit.

"Unit 202, this is unit 402. Over."

Almost instantly the call was answered. "402, this is 202. Go ahead." The signal was loud and clear—as good as any mobile signal could be.

But 202 was driving along a mountain road southeast of Antlers—some 150 miles airline from 402!

Unusual? In many systems, yes—but in the new CD-oriented system of the Oklahoma State Highway Department, such communication is an everyday affair.

"I anticipate that it will be extremely difficult to find any place in the state where a mobile cannot talk back to division headquarters," is the way communications chief Pete Howard describes his system's performance.

What's the secret of getting such performance?

The answer is simple—so simple that it's almost unique. Says Howard: "Primarily we are interested in the civil-defense aspect, and in all the planning we have tried to meet the needs of civil defense."

The result: a system composed of 56 base stations, 33 towers, more than 300 mobiles, and unsurpassable performance.

Although designed completely with the needs of state CD in mind, the system belongs entirely to the highway department. Civil defense uses it only during tests or an actual disaster.

The astonishing mobile-to-mobile performance is a result of the system concept. No mobile is able to contact any other mobile direct—not even if they are bumper-to-bumper. All mobile transmissions go by way of relay stations.

"In effect," said Howard, "this puts a 100-foot tower on every mobile unit."

All mobile units are rated at 80 watts, while the base stations (both control and relay) are 50-watt units. Exceptions are the state control station and its duplicate in Oklahoma's new underground "emergency state capitol", which are 330-watt affairs. General Electric supplied the equipment.

Two channels are used, both in the VHF high-band region. One, A channel, is termed the "maintenance" channel and is used primarily by work crews. Most mobiles are capable of operation on this channel only.

The other, B channel, is the "command" channel. All relay stations and a number of mobiles are equipped to use this channel also.

The system is just two years old. Construction began in January, 1961, and was scheduled for completion by January, 1963.

The CD approach was kept in mind from the very start. "We planned coverage for any emergency that might arise," said Howard.

But all was not smooth sailing. Civil Defense does *not* plan the system for you, Howard explained. Instead, the CD people state "things they would like" and it's up to the system designer to provide them.

"We would write up a plan and send it in," recalled Howard, "and it would come back. Not good enough."

When the final plan came back approved, Howard began on "Phase I". This involved installation of 44 base stations, 26 towers and buildings, 33 auxiliary power supplies, and 75 mobile units.

"We operated with this for a year," explained Howard, "finding the dead spots." This approach to the system, again, was a bit unusual. "In most new systems," Howard went on, "the operators look for the good spots. We didn't. We looked for the bad spots instead. We figured that if we filled in the bad spots, the good ones would take care of themselves."

When all the dead spots were located, "Phase II" began. This required installation of 13 more base stations—most of them additional relay stations—and an additional 233 mobiles. Every one of Oklahoma's 77 counties will have a minimum of three mobile units when the system is completed.

The system is almost failure-proof. Each of the 56 base stations is equipped with emergency standby power; seven seconds after commercial power disappears, the standby unit comes into action (the delay is to avoid cycling on momentary dropouts in thunderstorm-prone Oklahoma). The emergency power supply continues to operate for 5 to 7 minutes after commercial power comes back, to protect equipment from the surges which usually accompany re-establishment of power.

At the base station in the state's Capitol Office Building, the SHD transmitter is the *only* power circuit in the building which would still be live if commercial power were lost. Even the lights in the dispatch room would be dead—but the transmitter would remain on the air.

Howard and his co-workers say they are "exceptionally happy" with the equipment. "It's doing much more than the engineers expected it to do," he said. Unfortunately, it's doing so much more that one problem resulted—interference!

It seems that, on A channel, work crews in the southeastern corner of the state were tieing up the channel in the northwestern quadrant. While this might be a blessing in time of disaster, in ordinary workdays it proved nothing but a nuisance.

The problem is being solved in Phase II by installation of selective coding equipment on all units. Thus, a work crew near Antlers would dial the unit they need communications with—and the relay stations carrying their message to the other parts of the state will remain quiet.

Selective call equipment has been used on the command channel from the beginning. However, installation of this accessory on all mobiles posed quite a coding problem.

It was solved by going to a two-digit system to turn on the state by zones. Within each zone—which corresponds to the SHD district—every unit can reach every other unit. By dialing the zone's "all-call" number, the state headquarters can call every unit in the zone simultaneously.

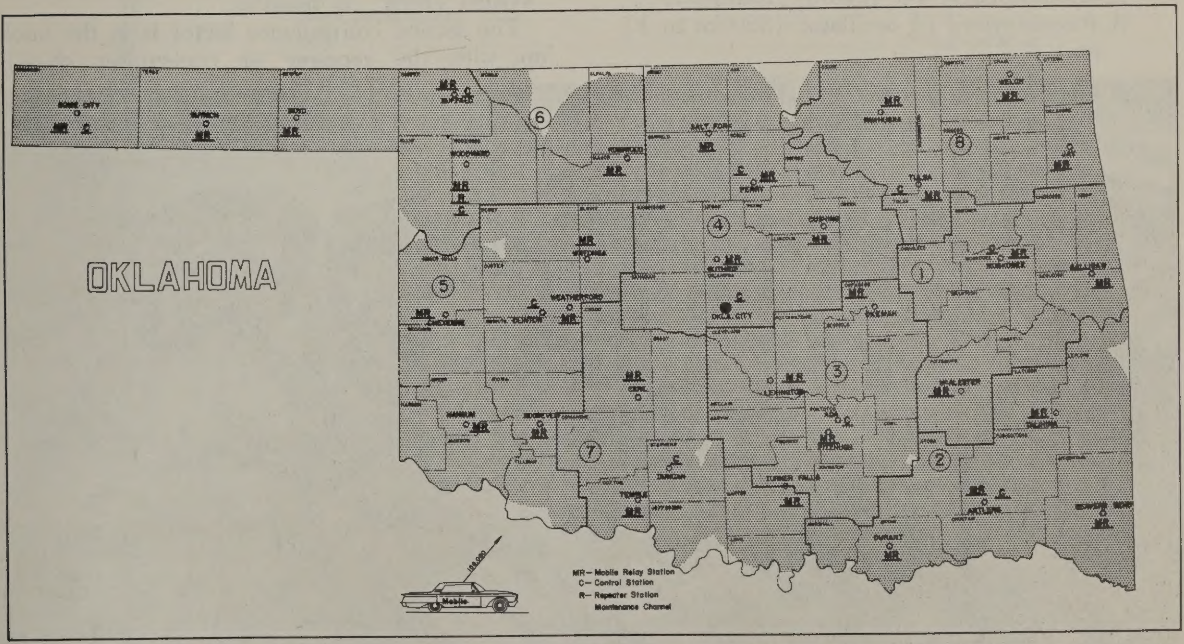
Surprising though it may seem, the total-coverage requirement was filled without the use of special custom-made antennas. Standard stock antennas are used throughout the system. The desired patterns were obtained by side-mounting the arrays, and changing the tower-to-antenna spacing.

In some places, antennas are spaced out ¼ wave, to give a two-lobed pattern. At others, full-wave spacing is used to get an elongated cloverleaf.

A byproduct of the emergency-planned concept is that *any* two-channel mobile in the system can become system control station. Howard and his associates proved this during the early days of the Cuban crisis:

"We decided we had better find out what would happen if the Capitol were knocked out, since the new emergency center wasn't finished. We took a standard filing drawer; it turned out to be just big enough to put a mobile unit, Secode attachment, and 12-volt battery inside. Then we hauled this up to the tower, unplugged the coax from the regular transmitter, and plugged our 'portable' in instead. It was able to reach every division headquarters in the state."

(Turn to page 9)



APPROXIMATE COVERAGE data for Oklahoma Highway Department system. Shaded areas include all territory within 70-mile radius of a base station. Apparent gaps are filled by skewing radiation patterns of antennas.

"Service Shop in a Box"

If you [illegible] to go into the business of servicing FM two-way radio with only one piece of test equipment at your disposal, what would you choose?

The question is pure fancy, of course. No service technician, no matter how clever he might be, would be able to stay in business long with just one piece of test equipment. Among other things, he would at least need a good d-c multimeter and a-c voltmeter, a signal generator and a transmitter deviation meter. With these he would be able to perform a fairly comprehensive operational check on FM two-way radio equipment . . . in the shop.

This brings us to another question, however. How would the technician carry all of these pieces of test gear out into the field?

One way would be to use the Motorola Model S1059A Portable Test Set, which aptly has been nicknamed the "service shop in a box". Some of its major features include:

A direct-reading multiple-scale d-c voltmeter,
A transistorized a-c (audio) voltmeter,
A transistorized i-f oscillator (350 kc to 13 mc),

by Bill Kemper
MOTOROLA Communications and Electronics
Chicago, Illinois

A transistorized r-f peaking generator (4 mc to 960 mc), and
A transistorized frequency deviation meter.

This compact (16 pound) battery-powered test unit has three operational benefits important to any service shop owner who is trying to squeeze a profit from a medium to high volume service business: 1) Convenience; 2) Speed; and 3) Versatility.

The key to the portable test set's convenience is in two of its features. First, it is battery operated and portable. This means that it can be used right where you find the radio, be it in the trunk of an automobile or on a remote mountaintop, and since there is no need to remove the radio set from its environment, a complete "system check" is possible.

The second convenience factor is in the hookup with the receiver or transmitter chassis.

NATURAL ENVIRONMENT testing of equipment is made easy when service technician uses battery operated portable test set. Although text describes specifically Motorola's S1059A, similar equipment is produced by other manufacturing firms.

C·P COMMUNICATION ANTENNA SYSTEMS

—mean

CERTIFIED PERFORMANCE!

BASE STATION COAXIAL ADVANCED DESIGN ANTENNA (2X-Omnidirectional Gain)

CAT. No. 79-509, FREQUENCY RANGE 108-174 MC*

Cat. No. 79-509 2X-Gain Antenna combines the simplicity of a coaxial antenna with the gain of a more complex structure. Though external appearance is that of a standard coaxial antenna, the union of special element lengths and internal matching devices produces 3 db omnidirectional gain.

SPECIFICATIONS

Electrical:

Nominal input impedance	50 ohms
Maximum power input	500 watts
Omnidirectional gain	3 db
Internal feedline	RG-8A/U
Flexible terminal extension	18″ of RG-8A/U
Termination	Type N male with Neoprene housing
VSWR	1.5:1
Bandwidth	±1%
Lightning protection	Star gap

Mechanical:

Skirt	2″ dia. red brass
Whip rod	6061-T6 aluminum
Support pipe	1-5/16″ dia. hot-galvanized steel, 24″ minimum length exposed available for mounting
Rated wind velocity	100 MPH at 150 Mc
Lateral thrust at rated wind	19 lbs. at 150 Mc
Bending moment 6″ below skirt	55 lbs. at 150 Mc
Weight	30 lbs. at 150 Mc

**Exact frequency must be specified*

SINCE 1933

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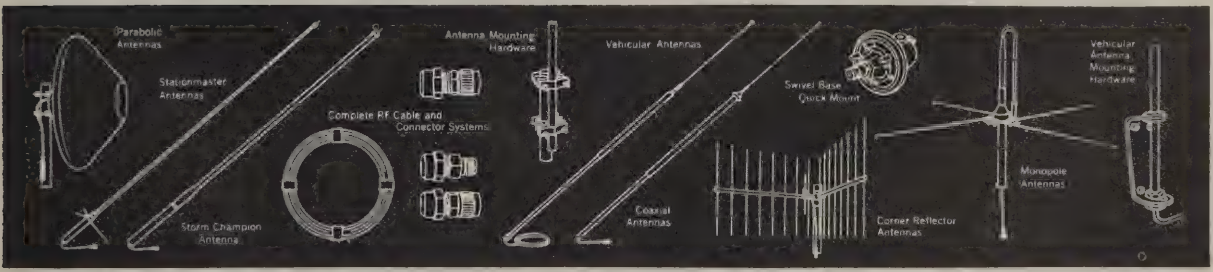

Nearly all Motorola FM receivers and transmitters currently in use are equipped with an 11-pin metering receptacle mounted on each of these chassis, with all important circuit metering points brought out to this one location. The portable test set, on the other hand, has a 20-pin male receptacle which connects to either of the chassis receptacles through an adapter cable. Thus, when the hookup is made, all key voltage and current readings are present simultaneously at the test set, and need only to be read on the meter.

Incidentally, for other metering applications, it is possible to use the 0-50 ua portion of the meter by itself through a phone jack connection on the test set.

Even though most other radio manufacturers do not provide the centralized metering receptacles as a standard feature on their chassis, it it is a relatively simple matter for a resourceful technician to provide them for himself. The time spent in wiring a chassis for this centralized metering can save many critical hours throughout the life of the radio set in testing, alignment and trouble-shooting.

This leads us to the second operational benefit, *speed*.

The portable test set has a rotating circuit selector switch, which automatically brings each chassis voltage or current reading out to the multiple-scale meter, where it may be read according to the appropriate scale. Consequently, the servicing technician simply has to: 1) plug in the adapter cable; 2) set up the desired metering function on the test set; and 3) rotate the circuit selector switch in order to obtain a complete metering picture of the chassis under test. Thus, isolating a malfunctioning circuit or running a preventive maintenance check is accomplished in a matter of seconds, rather than minutes or hours.

Now, the technician is ready to go on to the next operation; alignment of the radio set's tuning adjustments. Here is where the versatility of the portable test set comes in.

Let us say, for example, that the technician wishes to tune an i-f stage of a receiver. The test set provides sockets for mounting three control crystals; so, as many as three different intermediate frequencies can be selected by simply turning a socket selector switch; or, an unlimited number may be selected by substituting crystals in the sockets. The transistorized, crystal-controlled oscillator will then reproduce the desired intermediate frequency signal according to the characteristic frequency of the crystal selected. This can be either on a direct frequency basis, or as a second or third harmonic of the crystal frequency, thereby extending the effective range of the oscillator from 350 kc to 13 megacycles.

For example, if he wishes to tune a 2nd i-f of 455 kc, the technician "selects" the 455 kc crystal, and couples the output of the test set oscillator loosely to the grid of the 2nd mixer stage by means of an r-f extension cable and probe. Then, with the test set function selector switch in the RCVR position, and the circuit selector switch in the desired circuit monitoring positions, the low i-f circuits can be tuned to the exact 455 kc frequency as prescribed in the appropriate receiver alignment instructions.

The peaking generator, which is an optional feature on some test set models, is a crystal-controlled signal source which provides r-f signals ranging from 4 mc to 960 mc. Normally, it would be used for peaking of the r-f stages of the receiver, but it could also be used to provide additional intermediate frequencies for tuning of the i-f stages. As many as nine different frequencies can be selected and reproduced by rotating a nine-position selector switch, or an unlimited number by substituting crystals in the eight internal and three external sockets provided on the peaking generator.

Finally, we come to the deviation meter panel, which is also optional with certain models of the test set. Since it is a unique feature for this type of application, we shall describe its operation briefly (Figure 1).

Essentially, the deviation panel is a receiver which is used for measuring frequency deviation of FM transmitters operating in the 20 to 500 mc range.* The number of different frequencies on which it may operate is unlimited, practically speaking, since the function of a local oscillator is provided by either the test set's peaking generator, or an equivalent separate signal generator.

R-F signals reaching the antenna enter the crystal mixer in order to heterodyne with the output of the external "local oscillator". This produces a 455 kc intermediate frequency containing the original modulation. (Two stages of amplification and an impedance matching stage are inserted between the oscillator input and the crystal mixer.)

The 455 kc signal, with the modulation superimposed on it, then passes through three stages of amplification and two limiters before entering the discriminator, where frequency deviation is converted into an audio signal. The audio output from the discriminator then enters a two-stage audio amplifier, which uses negative feedback. (The feedback and temperature compensation characteristics of these stages prevent large variations in gain resulting from variations in transistor parameters and supply voltage.)

The output of the two audio amplifiers then enters the detector stages, where peak deviation is detected, regardless of waveform. These stages

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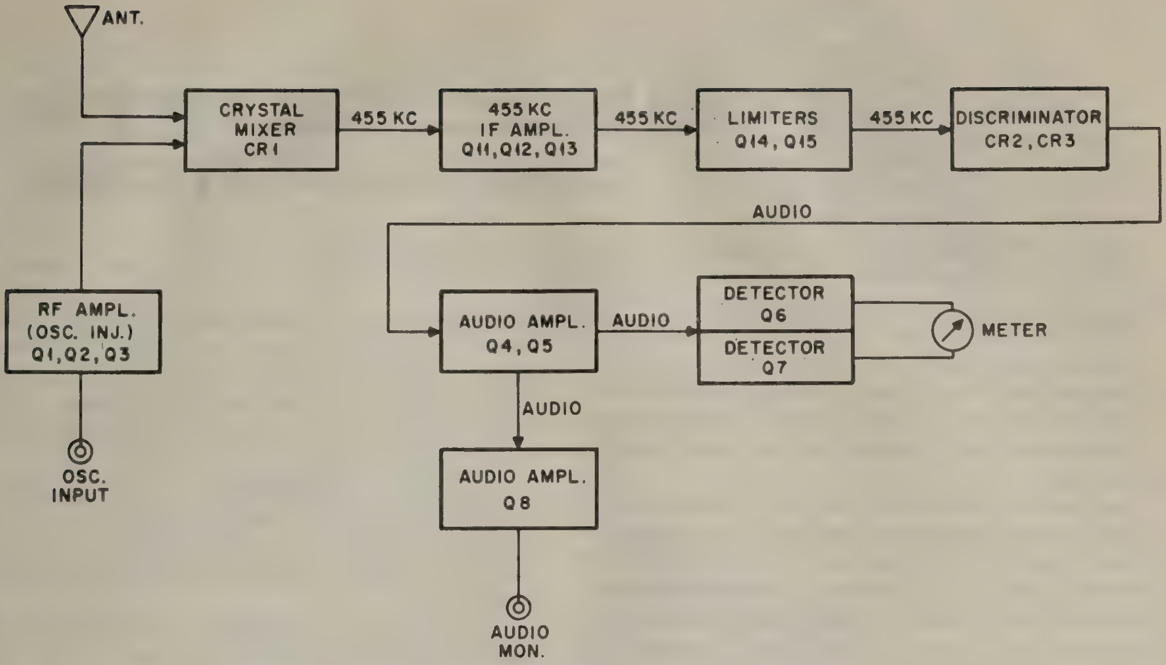
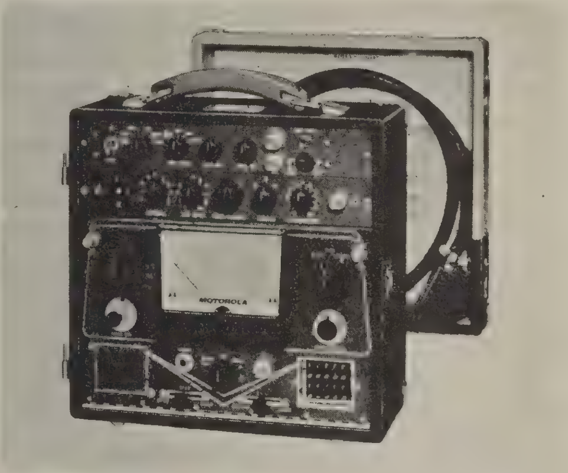
* Transmitters with frequencies up to 1000 Mc can be measured by tapping the signal off multiplier stages rather than the output.



BLOCK DIAGRAM of deviation meter in Motorola S1059A test set.

have a fast charge/slow discharge characteristic to permit detection of voice modulation. (However, due to the large peak-to-average voltage characteristics of voice modulation, sine wave modulation would be the most accurate for deviation measurement.)

The output of the detectors is then measured by a peak-reading voltmeter, which is calibrated to read half of the peak-to-peak deviation. The deviation may then be read on any one of three meter scales, 16 kc, 8 kc or 1.6 kc, with the latter having particular value in reading code tone deviation from coded squelch transmitters. Also, a third audio amplifier stage is connected to the output of the first two audio stages, and its output is connected to a jack so that the audio signal may be monitored on a speaker. ▬



MODEL S1059A portable test set is shown in detail. Unit includes complete circuit testing facilities, a peaking generator and a deviation meter.

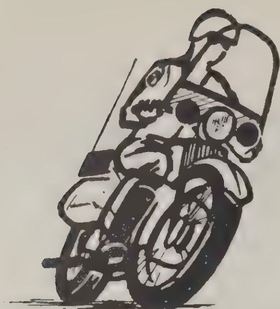
ANOTHER MEMBER of the Motorola service family —the TEKA-25. This six-compartment case matches the test set box and protects the acecssories.

C. D. . . . from page 5

Needless to say, the "portable" is now cached in a safe place for any possible need.

When the new emergency center is completed, changeover from the present control station to the underground unit will be a single-switch affair. This will probably eliminate the need for the file-drawer portable—but in the meantime Oklahoma's state communications are assured.

What does all this mean to you as an industrial or public-safety communications man? The answer lies in Howard's simple description: "In all the planning we have tried to meet the needs of Civil Defense." And what did he get? One of the best-performing systems in the nation. This same approach will work for you. ▬



PUBLIC SAFETY COMMUNICATIONS

by Robert E. Brooking, Communications Engineer — City of Burbank, California

1962 IN REVIEW

Another year has passed into history. As we look back, what has 1962 meant to those who use the Land Mobile Radio Services? What has it meant to those of us in Public Safety communications?

One year ago Bob Cooper, Jr., Publisher of Communication Horizons, published an editorial in this magazine. It concerned an action developed by the Land Mobile Communications Section of the Electronic Industries Association. This action took place at the E.I.A. meeting in Los Angeles.

Comments were to be filed in connection with F.C.C. Docket No. 14229; In the Matter of Fostering Expanded Use of UHF Television Channels; asking that the matter be expanded to consider the land mobile radio needs.

But as Bob reported, the filing didn't take place. The industry didn't agree.

Yes, we were stunned; especially after listening to the speech by Mr. Robert Galvin, President of Motorola, at the 1961 National Conference of the Professional Group on Vehicular Communications of the Institute of Radio Engineers.

In his speech, Mr. Galvin emphasized three main points: 1. There must be a single management agency for the radio spectrum in place of the present divided responsibility; 2. There must be a solution to the television allocations problem; 3. And soon! Mr. Galvin can hardly be termed a radical. Further, his company manufactures both TV receivers and land mobile radio equipment. Mr. Galvin admits without hesitancy that he cannot run his organization alone and that he has secured the help of a staff of competent engineers to help.

There are other organizations that think this way too. General Electric has some engineers with excellent backgrounds in two-way radio. One of these men is Dick Gifford, a member of JTAC. In this latter capacity he has been in a position to study the problems of radio spectrum management. This column has previously quoted the presentation of Mr. Gifford before the APCO National Conference at Clearwater, Florida. Mr. Gifford also had some opinions to give at the National I.RE.. Conference of PGVC at Anaheim, Calif. on December 6 & 7, 1962.

Yet, in spite of these viewpoints by learned men, qualified to know; in spite of testimony that there are 1,700,000 land mobile transmitters licensed today to private radio systems; there are still those in the industry who seem to feel that nothing needs to be done.

In 1959 at the hearings on Docket No. 11997, conclusive evidence was presented to the Commission that the Land Mobile Radio Services would require an additional 40.8 Mc/s of spectrum space.

It was further pointed out that UHF would not provide a satisfactory solution for all of the land mobile needs. For covering large rural areas, such as State Police and Highway Maintenance, frequencies below 100 Mc/s are the best, since they have lower space attenuation. On the other hand, the susceptibility of these frequencies to degradation from man-made noise and interference in urban areas, particularly with reduction of F.M. deviation from 15 Kc to 5 Kc, renders them a poor choice for our metropolitan areas. Here the 150 Mc/s band offers an ideal solution particularly for Public Safety communications where car to car coverage is essential.

In the various industrial and land transportation systems where duplex channels are used and communication is limited to base-mobile and mobile-base with mobile to mobile communication not wanted, the 450 Mc/s channels offer an ideal answer. Man-made noise presents a minimum problem at these frequencies and the signal will bounce off steel buildings, filling in the canyons of New York City or Chicago with ease. But—we still haven't obtained the needed space in any band!

On February 20, 21 & 22, 1962 hearings were held before the Communications Subcommittee of the Committee on Commerce, United States Senate, in connection with S.2109, "A Bill to Amend the Communications Act of 1934 in Order to Give the Federal Communications Commission Certain Regulatory Authority Over Television Receiving Apparatus. The popular title is "The All Channel TV Receiver Bill."

The Hearings have been released in printed form by the U.S. Government Printing Office. They do make interesting reading and the Bill has now become law. Included in the report are comments submitted in behalf of the Public

Safety Radio Services and their dire need for more spectrum space in large metropolitan areas. Thus Congress has heard of our problems.

About the same time Dockets 14503 and 14507 were released. The reaction to 14507 was immediate and came from all parts of the country. That was the Docket to create fees for licensing radio stations. This was one time that everybody agreed and it would appear that there will be nothing further heard about fees; at least, for a while.

The reaction to 14503 was slower starting; but it is still being heard.

Then on April 6, 1962 representatives of Associated Public Safety Communication Officers, Eastern States Police Radio League, Forestry Conservation Communications Association and International Municipal Signal Association met in the Shoreham Hotel in Washington, D.C. Out of this meeting came the Public Safety Communications Council. Last month's issue of Communication Horizons covered the October 1962 meeting of the Council in detail. On January 3, 1963 the National Frequency Advisory Chairmen of the organizations mentioned above plus the American Association of State Highway Officials will meet in offices of the Commission to establish the means for coordinating the interspersed frequency assignments including Local Government.

During the summer the Commission released Dockets 14712, 14729 & 14744. These all dealt with microwave and have been previously discussed. In September, Docket 14785 was announced. This Docket proposes to split the channels in the 72-76 Mc/s band from 40 Kc to 20 Kc but it would continue the present severe limitations concerning protection to TV channels 4 and 5.

An interesting development concerning this band has recently taken place in Los Angeles. Emergency call boxes are being installed about one quarter mile apart along the freeways. These devices transmit a short duration radio signal when activated, thereby bringing aid in case of traffic accidents, etc. This is a developmental system. What happens if the TV viewers near the freeway complain of interference to their picture caused by a motorist activating the call box to bring an ambulance to the scene of an injury accident?

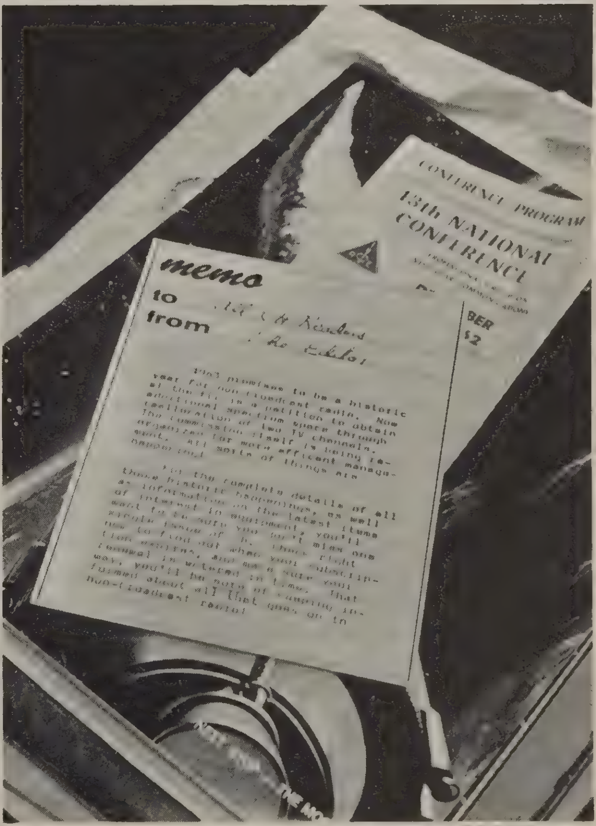
Then on October 1, 1962 came the big news. Rebuffed in Los Angeles, the Land Mobile Communications Section of E.I.A. had reformed its ranks and had submitted a petition to the Commission asking that TV channels 14 & 15 (470-482 Mc/s) be re-allocated for use by various Land Mobile Radio Services.

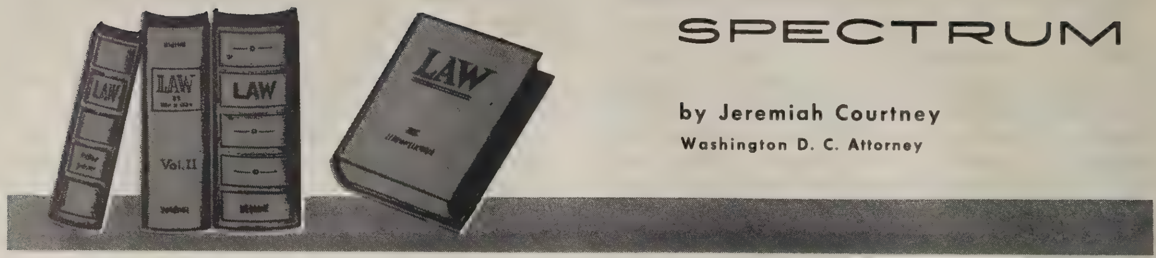
Proponents of the petition admit that this action will not completely solve the spectrum problems confronting the land mobile users; but it does do two things. First, it represents the first effort in more than twelve years to obtain needed operating frequencies for the land mobile users through re-allocation; thus far we have reduced the separation between channels from 120 Kc to 60 Kc to 30 Kc and even to 15 Kc where geographically possible. Second, since we can't split cannels any more (when a decision is announced on Dockets 14503 and 14785, all channels will *be* split) this petition represents the only means of alleviating the overloading of existing radio channels.

We cannot wait for years while a major reallocation is effected. This too, is needed and must eventually take place. Meanwhile a tremendous wave of support for the petition by the land mobile users has reached the Commission.

On November 5, 1962 another important announcement was made. It didn't appear in the land mobile releases; in fact, probably many of us did not see it, but it is noteworthy. Broadcasting Magazine, in a two-page article, reported that the engineers agreed UHF-TV does work. The tests in New York City proved it. Chairman Newton N. Minow of the Commission stated: "Its success in the most difficult reception area of the country shows that UHF will work anywhere and paves the way for the growth of commercial and non-commercial TV." A few days later the Commission released an engineering report which verified this conclusion.

As we begin the new year, our big problem still remains—but we can also begin to see the resolution of this problem.





the LEGAL SPECTRUM

by Jeremiah Courtney

Washington D. C. Attorney

Spectrum management is a matter of considerable interest to the frequency-starved mobile radio services. The congestion in some services is so bad that even individual users are beginning to interest themselves in how to go about the correction of the situation in which they find themselves.

For example, a Business Radio Service user in the Tampa, Florida, area recently asked our advice with respect to his radio position. He had purchased a $30,000 system from a major manufacturer about a year ago. He had paid $10,000 on the equipment; had $20,000 to go. But the increasing congestion made the system useless for the purposes for which purchased. What to do?

The "point of no return" is a familiar phrase in the aviation industry. It is the point in a trans-oceanic flight—fuel supply, wind and all other factors considered—from which there can be no return to the point of origin. The pilot can only go forward. We start out in our problem with the basic premise that American Industry has reached "the point of no return" in its radio use. Any one who has reaped the benefits of radio controls will do everything in his power to avoid turning back the clock.

The problem then reduces basically to an explanation of the agencies or persons who could help Mr. Tampa regain the former efficiency of his radio use.

While there are several governmental agencies which might be interested in Mr. Tampa's plight, the major one is of course the Federal Communications Commission. Congress has given this agency the power to allocate the spectrum in the public interest. Mr. Tampa may therefore logically petition the FCC for relief. But as only one user, the practical wisdom of this course of action is open to question. And the same disability applies if Mr. Tampa should undertake the difficult and time-consuming project of seeing each of the seven FCC Commissioners.

Is there a more practical, more effective course of action, more likely to get quick results for Mr. Tampa? What do the experienced broadcasters who have frequency troubles do? Let us examine a case history.

The summer before last the FCC proposed a series of limited "deintermixtures," a process whereby all television broadcasting in a given market area would be conducted in the UHF band, necessitating the transfer of some television stations from the lower band to the higher band. The plan was limited to eight markets in various parts of the country, where only eight VHF stations would be involved.

The plan itself would not, of course, solve the basic lack in UHF receivers, and the Commission moved in an appropriate direction by asking the Congress to enact a bill which would require that all television receivers shipped in interstate commerce be equipped to receive all available channels.

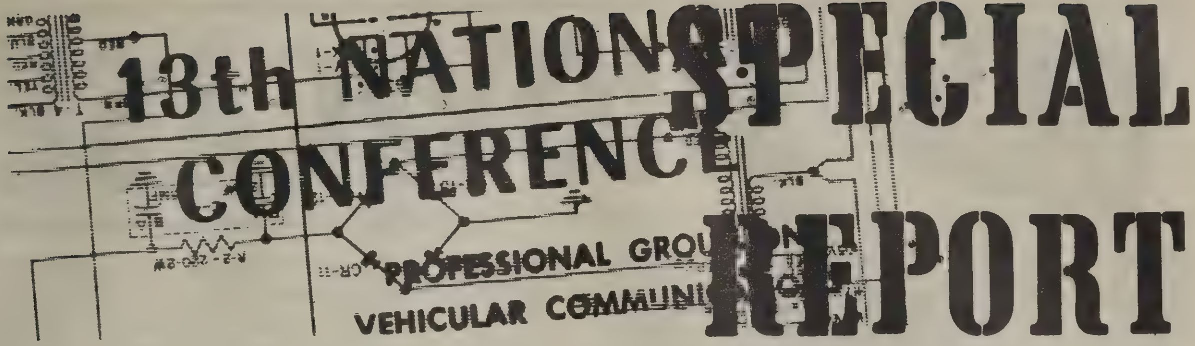
The television broadcasters received the Commission's deintermixture proposals with the same degree of enthusiasm that they would exhibit for a proposal that would nationalize the networks to insure better programming. The full details of their opposition are, of course, not public knowledge, but it is a foregone conclusion that they objected strenuously in every logical direction, including Capitol Hill.

Whatever the means by which it was reached, the result was a great victory for the VHF broadcasters, and we suggest, an equally great defeat in spectrum management because the vacated VHF space would have provided hundreds of highly desirable channels for the mobile radio services.

What was the result? The Commission agreed with the Interstate and Foreign Commerce Committee of the House that, in exchange for Committee approval of the all-channel receiver legislation, the Commission would forego its deintermixture proposal for the time being, and would not in any event reactivate the proposals without prior consultation with the Committee.

The moral of this broadcaster "victory" should be clear to other users who are confronted with difficulties in making use of the spectrum, *i.e.*, under sufficient pressure the Congress will not hesitate to over-ride the FCC in its basic allocation function.

If the solution of Mr. Tampa's difficulty is additional frequencies, and these are not available now and no effort is underway to produce them by the FCC, Mr. Tampa has a clear channel for relief, and the inalienable right to use it—his Congressmen.



13th NATION CONFERENCE SPECIAL REPORT

PROFESSIONAL GRO
VEHICULAR COMMUNI

Despite one of the worst fog sessions the Los Angeles basin area has been able to muster in recent years, the 13*th National Conference of the IRE Professional Group on Vehicular Communications* held in the Disneyland Hotel, Anaheim, California was an all-around attendance success.

Summing up the attendance of the sessions, well known industry figure Fred M. Link, consultant for mobile communications to the Radio Corporation of America, Camden, New Jersey, told CH Publisher Bob Cooper, "This meeting brings together the true elite of the Vehicular Communications Section of the IRE."

And well it did. Among the many, many distinguished communications people present were Stanley E. Estes of Estes Engineering Company (speaking on Ignition Interference), Dr. Eberhardt Rechtin, Director of the Deep Space Instrumentation Facility, Jet Propulsion Laboratories, the California Institute of Technology (speaking on progress in space communications), Curtis J. Schultz of Motorola, Inc. (speaking on cross-band operation), Harvey Platt, President of the Associated Public-Safety Communications Officers, Inc., Victor G. Reis, Chairman, National Association of Manufacturers Committee on Manufacturers Radio Use, and, Dr. Frederick G. Suffield, Head of the Advanced Laser Applications, Research and Development Division, Aerospace Group, at Hughes Aircraft Company.

Manufacturer after manufacturer on hand to display new products and discuss new developments in the field were pleased to find so many advanced state-of-the-art people present at the two-day conference which began the morning of December 6th.

Among the new equipment on hand that caught the participant's eyes were new transistorized units for high band, partially transistorized units for the 450 Mc band, and promises that smaller packages and more effective noise canceling circuits were just around the corner.

Of specific interest was the appearance of Stanley Boyle and others representing NORTHROP-Ventura. In August of 1961 engineers of a small California firm appeared at that summer's Long Beach, California APCO meeting to display a horizontal circular antenna called the 'Omni-Slot.' The antenna, which the manufacturers claimed radiated a true vertically polarized signal with gain within 1-2 db of a full length un-loaded vertical half wave, appeared to be a significant answer to mobile antenna problems in the 25 Mc and up region.

The firm never followed through by marketing the 'Omni-Slot' design however.

Now, according to Stan Boyle, NORTHROP-Ventura has taken over the design of the antenna, which proved so successful in tests run in Orange County, California by that county's communication engineer, Max Elliot.

NORTHROP-Ventura told CH they plan to have the Omni-Slot on the market for a wide range of frequencies (eventually 2 megacycles to nearly 1 kMc) with first deliveries by April of 1963.

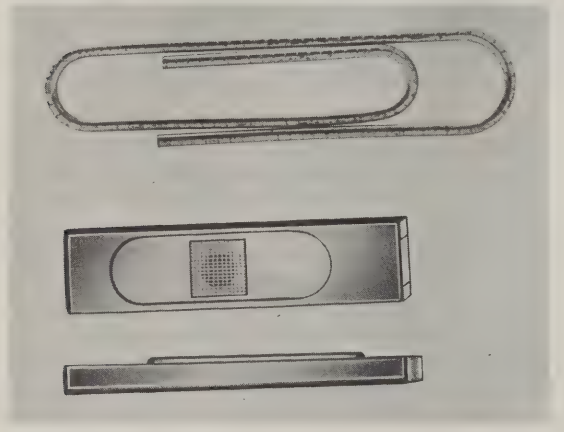
Many of the Conference participants took advantage of the Anaheim Conference location to visit Max Elliot's Orange County Communications complex, including the new $300,000 control center. Transportation was provided to the center by the Conference management.

The *emphasis* throughout the Conference was on the ever advancing state of the communications art. Particular time and energy was put into preparing papers for presentation on such subjects as "Remote Indication and Dissemination of Air Pollution Data by Means of VHF Radio," "Transistor Circuit Techniques for VHF Transmitters," and "A Solid-State UHF Mobile Radio-Telephone Transmitter."

Interest in better frequency utilization was evident throughout the Conference and the subject occupied more than its share of time on the rostrum and during informal group meetings. The last item on the Conference agenda, Friday afternoon the 7th was a panel discussion on this very subject with representatives from Industry, User Groups and Government.

The 14th National Conference of the Professional Group on Vehicular Communications will be held in Dallas, Texas, and all in attendance agreed that with a full 12 months to prepare for it, it should be the greatest ever.

CH SHOWCASE



MINIATURE HIGH-PERFORMANCE MIKE

A tiny microphone, smaller than a paper clip, yet sporting wide-range response and high output, has just been announced by *Shure Brothers, Inc.*, 222 Hartrey Avenue, Evanston, Ill.

The new unit, Model CA5A, weighs only 3/4 gram. Its small size and weight make it ideal, the maker says, for miniature equipment, hidden mike installations (bugs), and other super-small devices.

Manufacturers interested in samples for study, additional engineering data, or application engineering assistance have been invited to write Shure, describing their requirements.

GIANT WISH BOOK

A 672-page catalog, crammed full of all types of items of interest, has just been issued by *Allied Radio Corporation,* 100 North Western Avenue, Chicago 80, Ill.

The 1963 version of Allied's catalog sets a record for size; the firm calls it "the most comprehensive electronics directory in history" and we wouldn't quibble with them.

Included are some 70,000 separate types of devices and products, representing more than 600 manufacturers.

For your copy, drop a line to Allied and ask for catalog no. 630.

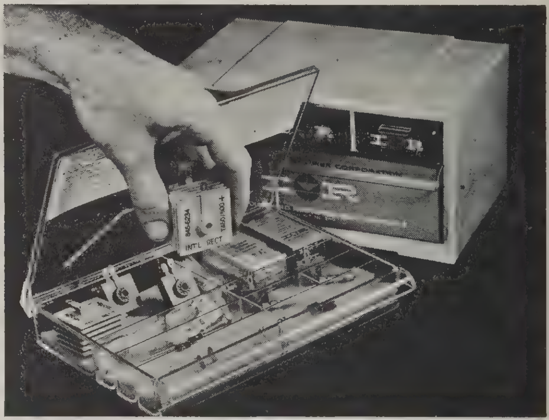
"DARK-HEATER" VERSION OF THE 6146

A "dark-heater" version of the 6146, a first of its kind, has been announced by the *RCA Electron Tube Division,* Harrison, N. J.

Designated as type RCA-8032, the new tube has operating characteristics similar to the 6146. Filament voltage is 13.5, either AC or DC. The heater is designed especially for mobile use.

RCA engineers say the "dark-heater" design offers a number of advantages, including longer tube life and reduced heater-cathode leakage.

For a technical bulletin on the 8032, write Commercial Engineering, RCA Electron Tube Division, Harrison, N. J. Tell them we sent you.



REPLACEMENT RECTIFIER KITS

Two new rectifier replacement assortments have just been announced by *International Rectifier Corp.,* 233 Kansas Street, El Segundo, Calif.

The smaller assortment, the IR Caddy Kit, contains an assortment of 16 rectifiers and is priced at $14.95. The larger, a bench cabinet for in-shop use, contains 31 rectifiers and is priced at $24.95.

Both assortments contain selenium stacks, plug-in silicon units, and axial lead diodes.

For full data, see your IR distributor or write the manufacturer.

MINIATURE POTENTIOMETERS

A new midget potentiometer design which incorporates the resistance element inside the control knob is now available from *Clarostat Mfg. Co., Inc.,* (Dover, N. H.) in a number of configurations.

The maker says the new design, Series 81, is mounted on a strip either singly or in multiples. The pot itself is less than 1/4 inch thick. Resistance range is from 1000 ohms to 5 megohms, linear or tapered. Standard tolerance is plus or minus 20%. Power rating is half a watt.

For full data and specifications, write Clarostat.

SAFE WIRE STRIPPER

A wire stripper which will handle Formvar, Teflon, Nylon, and other covered wires, yet cannot possibly damage the wire itself, has been announced by *Sentry Electronics, Inc.*, 707 S. Okfuskee Ave., Wewoka 2, Okla.

Two models of the unit are available; one is for bench use and the other is a gun model for handwork. Both are thermal strippers.

Sales Manager Ed Neugass says the difference between the Sentry strippers and other thermal models lies in two points: the temperature capability (the Sentry strips Teflon), and the price. The bench unit sells for $19.95 and the gun model for $11.95.

For full data and particulars, write Neugass at Sentry. Tell him where you saw this.

TWO MARINE RADIOTELEPHONES FROM SONAR

Sonar Radio Corporation, 73 Wortman Avenue, Brooklyn 7, N. Y., has announced the addition of two new units to their line of marine electronic equipment. The new units are a pair of transistorized marine radiotelephones.

Model 45, the smaller of the two, is rated at 45 watts power input. The other, Model 70, is rated at 70 watts. Both feature standard broadcast reception as well as six marine channels. The Model 70 has been designed to meet FCC requirements for commercial boatsmen.

Prices are $299.50 for Model 45 and $379.50 for Model 70; both prices include three pairs of crystals and microphone.

For additional specifications and data, write the manufacturer.

LOW COST ITV CAMERA

A low-cost industrial television camera suitable for closed-circuit use in conjunction with standard TV equipment has been announced by the *Denson Electronics Corporation*, Longview Street, Rockville, Conn.

Designated as the "AL-DEE" and priced at $239.95 with lens, the camera features a new type of electrostatic camera tube having sensitivity similar to that of the vidicon. Output may be adjusted for any U.S. channel from 2 to 6.

For full specifications and data, write Alfred C. Denson, president of the corporation.

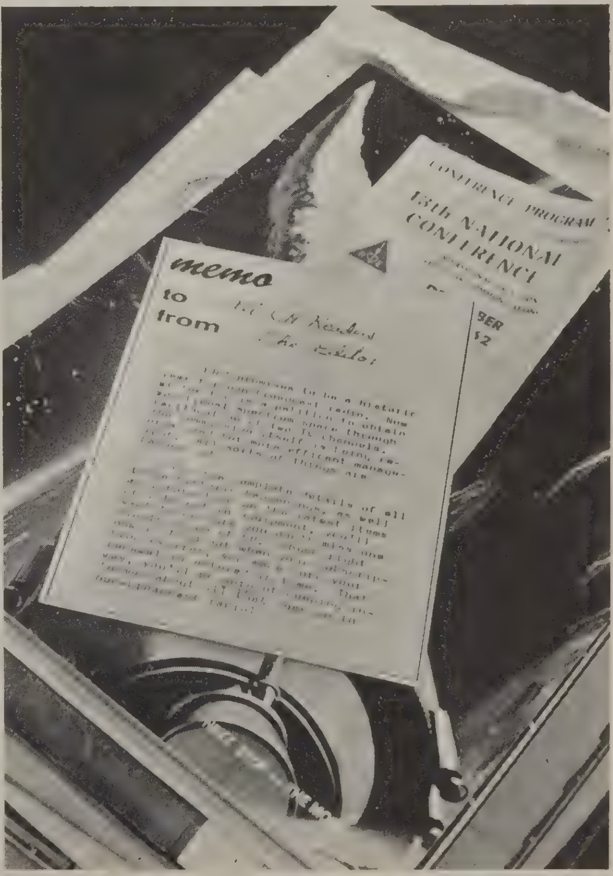
EMERGENCY LIGHTING UNIT

A completely automatic standby power unit to protect against the failure of any critical lighting and power interruption caused by loss of commercial power has been announced by *ATR Electronics, Inc.*, 300 East 4th Street, St. Paul 1, Minn.

The unit is available in sizes up to 250 watts power output, to operate from either 6 or 12 volts from a storage battery.

Each unit includes a charger for the battery and a DC-to-AC inverter which starts automatically upon loss of commercial power.

For full specifications and data, write ATR.



OUR MAN IN WASHINGTON

by Robert E. Tall
Chief
Washington Bureau

FCC EXECUTIVE DIRECTOR POST GOES TO PLUMMER

The most sweeping change recommended in the recent Booz, Allen & Hamilton management survey of the FCC—establishment of an executive director of the Commission—was accomplished this month.

The post—hottest spot on the Commission staff—went to veteran bureau chief Curtis B. Plummer.

Plummer's selection was seen in Washington as a testimonial to his ability and experience. He had been chief of the Safety & Special Radio Services Bureau since 1955, and prior to that had been chief of the Broadcast Bureau.

Plummer joined the Commission in 1940 as a radio inspector at Boston, and later served at various monitoring stations. A year later he came to Washington, and in 1945 was made chief of the Television Engineering Division. Five years later he was named Chief Engineer of the Commission.

Chairman Newton Minow said, in commenting on the establishment of the post and Plummer's promotion, "We look to this new office to come up with practical solutions to many of our procedural problems which have delayed and plagued us. I think we are indeed fortunate that Curtis Plummer has agreed to take on this task."

No successor to Plummer as chief of the Safety-Special bureau was named immediately; Assistant Bureau Chief Irving Brownstein is serving as Acting Chief in the interim.

The new post replaces the old position of Executive Officer and also includes broader duties. The former executive officer, Robert W. Cox, was named Assistant Executive Director.

CHANNEL 14, 15 COMMENTS SNOWBALL

More than 1,000 comments on the EIA Land Mobile Communications Section petition for reallocation of UHF TV channels 14 and 15 to the Mobile Radio Services were received by the December 4 closing date—and most of them were in support of the petition.

One late filing, by Forest Industries Radio Communications, asked another extension of the already-once-extended deadline. It was speedily denied.

Washington observers felt this indicated one of two possible outcomes for the petition—either the Commission had already been convinced by the flood of comments and needed no more, or the decision had been made to deny the petition and (again) no more comments were needed.

The expected heavy opposition from broadcasters failed to materialize, although the National Association of Broadcasters did file a comment in opposition.

The NAB charged that mobile services keep coming back for more, and described the present system of mobile radio as being "inherently wasteful" of frequency space.

They suggested a "reexamination of policy" looking toward establishment of a national common-carrier radio system to replace all "private" mobile radio systems, modeled after the existing wire-line common-carrier networks.

The NAB comment also declared that "deletion" of any UHF TV channels would deal "a crippling blow" to the development of UHF television broadcasting.

All major organizations representing mobile radio users filed comments supporting the action, although some were lukewarm in their support.

In addition, hundreds of individual users filed comments in support.

Opposing comment, in addition to that from the NAB, came from existing licensees of channels 14 and 15, from "Maximum Service Telecasters," and from the Consumer Products Division of the EIA.

The Consumer Products comment marked the first time in history that one EIA division has publicly opposed the move of another. However, it has become public knowledge in the past year that the same internal competition in the EIA caused collapse of plans to request VHF TV allocation a year ago.

Deadline for reply comments has been set at December 19.

ISM HEATER RULES CHANGED

The Commission has made final its amendments to Part 18 Industrial, Scientific, and

Medical Services rules to reduce delays between the time when an industrial heater operator is notified he is causing interference and the time when he may resume operation.

Under the new rules, permission to resume operation may be obtained by telephone rather than applying in writing.

BELL SYSTEM, RCC ATTORNEY PLANNING TALKS

Bell System officials and Washington communications attorney Jeremiah Courtney are planning discussions of interconnection arrangements, to follow already-scheduled talks between AT&T and the NMRS on the same subject.

Courtney had asked an FCC study of interconnection arrangements, on behalf of a number of his clients. FCC Chairman Minow denied Courtney's request. Courtney then communicated with Hubert L. Kertz, AT&T assistant vice president.

In reply, Kertz wrote that the Bell System companies "are and have been most anxious to conclude interconnection arrangements with miscellaneous common carriers."

NEWSHAWK ACQUITTED OF 605 VIOLATION

An Oakland, Calif., news-tipster has been acquitted of a charge of violating Section 605 (the secrecy clause) of the Communications Act.

Kenneth G. Fuller, a former police officer, had been accused of violating the secrecy clause by setting up his news-tip service. He allegedly used a 30-receiver monitoring system to listen to all police radio dispatches in his area, and charged a fee for his reports to customers.

Judge Stanley A. Weigel of the U.S. District Court in San Francisco ruled that Fuller's activities were not in violation of Section 605, after a number of policemen at the trial testified it was common practice for news agencies to monitor their broadcasts.

FCC REORGANIZES COUNSEL'S OFFICE

The FCC has created a number of new offices in the Office of General Counsel and appointed staff members to fill them.

One of the more significant appointments was that of John C. Harrington, former chief of the Broadcast Bureau's Complaints & Compliance Division, to be Assistant General Counsel in charge of the Enforcement & Defense Division.

Washington observers believe this may be another indication of tougher enforcement policies in coming days. They point out that the Broadcast Bureau, with Harrington in charge of "Compliance," has used its recent "forfeiture" powers to a large extent.

FILING FEES HIT AGAIN

The FCC's proposal to charge filing fees, which was buried under an avalanche of adverse

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comment last May, was hit again this month when the International Association of Chiefs of Police submitted a resolution "vigorously" opposing such action.

The IACP resolution, adopted at the group's October meeting in St. Louis, pointed out that such a fee is "an unnecessary burden to the police service" and reminded the Commission that many states and cities provide "communications assistance and services free of charge to a variety of federal agencies."

BELL TO INTRODUCE DIAL TWO-WAY IN 1964

The Bell System plans to introduce dial two-way mobile radio service "in early 1964," an AT&T executive told the API Transportation Division at its Chicago meeting.

No details were announced. The revelation came during a talk by James E. Dingman, AT&T executive vice president, on "Communications—Today and Tomorrow."

25-42 Mc REPLY COMMENTS FLOOD COMMISSION

The FCC mail room this month, already crowded by response to the Channel 14 & 15 reallocation comment call and other matters, became even more crowded as comments flooded in concerning the 25-42 Mc service-allocation proposals before the November 30 deadline.

No immediate count of the number of reply comments filed was available, but Commission sources said it was comparable to the number filed in the reallocation action.

One agency filing comment, the International Association of Chiefs of Police, urged the Commission to "reevaluate the priority of need of the various services for frequencies."

IACP declared that "Both present and future demands of police agencies for communication capability cannot be met" due to channel saturation.

PROCEDURE RULE PROPOSED

The Commission has, on its own initiative, proposed rulemaking which would add a new section to its procedural rules.

The added rule would "clarify and emphasize the requirement that applicants keep the Commission informed about material changes in the status of their applications," a Commission spokesman said.

PUBLIC SAFETY MOBILE RELAY CHANGE ASKED

The California Public-Safety Radio Association has petitioned the FCC for rulemaking proceedings "to make possible the licensing of mobile relay stations . . . on frequencies below 50 megacycles" in the police, fire, forestry conservation and highway maintenance radio services.

CPRA noted that present protective devices would ensure that such stations would not be activated by foreign (skip) transmissions, and cited several instances in which the existence of such stations could have resulted in savings of life and property.

LOGBOOK

A CALENDER OF IMPORTANT MEETINGS AND EVENTS OF INTEREST TO MOBILE COMMUNICATIONS.

Submit items for this column to CH Washington Bureau Chief, ROBERT E. TALL at 1327 F STREET N.W., WASHINGTON 5, D.C.

Dec. 19—Deadline for "reply" comments to statements with respect to petition of Electronic Industries Association's Land Mobile Communications Section seeking reallocation of TV channels 14 and 15 to land mobile radio services. (RM370)

Jan. 1—Date when new revised FCC Form 505 must be used for Class B, C, or D Citizens radio applications.

Jan. 15—Deadline for comments on FCC proposals for comprehensive revision of rules for citizens radio service (docket 14843).

Jan. 17-18—Mid-Winter meeting of Florida Chapter of Associated Public-Safety Communication Officers. Mara Vista Beach Court. West Panama City Beach.

Jan. 17-19—Annual meeting of National Telephone Cooperatives Association. Flamingo Hotel. Las Vegas.

June 15, 1963—Special Industrial radio service licensees eligible in Manufacturers Radio Service must transfer to frequencies in the manufacturers service.

Oct. 31, 1963—Mobile radio users must meet full narrow band technical standards of FCC.

Nov. 1, 1963—Fire radio systems must move off frequencies allocated to the police radio service.

on other horizons

Amateur Radio Above 50 Megacycles

VHF HORIZONS

Two-Way Radio for Business and Pleasure

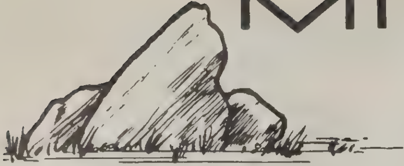
CB HORIZONS

tv

The Professional Television Journal

HORIZONS HP PUBLICATIONS

the first family of electronics specialty magazines



MILESTONES

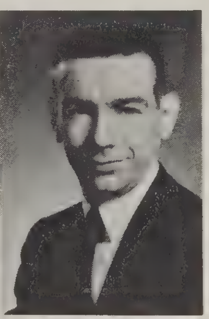
PEOPLE, PLACES, AND THINGS IN THE NEWS

As usual, people made most of the news this month. The list of promotions and transfers included two from Motorola, one from RCA, and a number from smaller concerns.

At *Motorola,* John G. Nauman was appointed account executive manager for the midwest, directing a staff of account executives across the middle part of the nation. Nauman, with Motorola since 1950, had been a regional sales manager since 1956.

Also at *Motorola,* Edward Donnelly was named mobile dial radiophone specialist for the eastern part of the country. With the firm since 1959, Donnelly had been a special products service representative and district service manager.

At *RCA,* Harry G. Johansen was appointed manager, west central region sales. He will headquarter in Kansas City and will have responsibility for two-way radio sales from St. Louis to Denver and north to the Dakotas.



Ryan

In Dallas, Texas, *Texas Research & Electronic Corporation* announced appointment of James M. Ryan as product sales manager for the TRE Communications Division. Ryan came to TRE from *Mark Products,* where he was sales manager. He is well known in the communications industry, as he was in charge of all communications antenna marketing at Mark.

Hugh S. Allen, Jr., vice president of sales with Lang Worth Feature Programs since 1959, returned to the engineering field with the announcement that he has joined *Kahn Research Labs, Inc.,* Freeport, Long Island, as director of engineering applications. Kahn produces compatible single-sideband, AM stereo, and communications systems.

At *American Microphone Company,* Galien, Michigan, Clement F. Bailey was named plant manager. Bailey had been supervisor of quality control for all products at *Electro-Voice,* now American Microphone's parent concern.

Stancor Electronics, Inc., Chicago transformer, filter, and equipment manufacturers, has appointed John Walovich as director of engineering. He has been on the Stancor engineering staff since 1959.

In New York City, at *Hammarlund Mfg. Co., Inc.,* a man well known in communication circles stepped into the president's chair. He is Stuart "Stu" Meyer, Hammarlund's vice president in charge of engineering for several years. Meyer has written for CH in the past; he has been an avid ham radio operator for more than 25 years.

And in Saugerties, N. Y., at *Ferroxcube Corporation of America,* Eugene S. Timlin has been appointed to the application engineering department.

And finally, Bennett Cook, former advertising manager of *Stancor Electronics, Inc.,* has been appointed production manager at *Stral Advertising Company, Inc.,* Chicago advertising agency specializing in electronic industry accounts.

Quite a number of sales representatives have been appointed this month.

New-Tronics Corporation, Cleveland antenna firm, announced three reps: Hollingsworth & Still, Inc., Atlanta, Ga., for seven southern states; MESA Inc., Prairie Village, Kansas, for five midwest states; and Shalco Inc., Ferndale, Mich., for Michigan and northwest Ohio.

Two firms were also named representatives of *Hammarlund-COC* equipment. They are Griffith M. Morgan Company, Chicago, and W. F. Satterthwaite, Lansdowne, Pa., and Colt's Neck, N. J.

And back in Los Angeles, *R. W. Thompson Associates* of 1220 Wilshire Blvd. has been appointed sales representatives for *Tri-Ex Tower Corporation* and *Stoner Electronics.* Thompson already represents *Hammarlund* and *Hy-Gain,* among others.

A new firm specializing in laser R&D and also marine radio was announced in Chicago. Headed by F. Willard Griffith II, the firm is *Astromarine Products Corporation.* Plant location is Melrose Park, Ill. Planned products include a line of marine communication equipment and another line of solid state LASERs.

Western Union Telegraph Company has ordered a colossal two-way mobile radio system from *Motorola.*

The new system will include 108 base stations, 93 mobile two-way units, and 12 special supervisory station consoles.

Purpose of the system is to provide pinpoint communications with maintenance men serving WU's new coast-to-coast microwave network. The system will be controlled from 12 dispatch offices scattered from Boston to Los Angeles.

Completion date is set for early 1963.

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P. O. Box 1557

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AND WHAT'S HAPPENING WITH YOU THESE DAYS?

For months now, we here at COMMUNICATION HORIZONS have been telling you what we are up to. Now, we'd like to know what's going on in **your** shop. What are your current problems? What tricky jobs have you accomplished lately? **What's new?**

We ask this for two reasons. One, if you tell us what **you** are doing then we will be able to better serve you by bringing you the information you need. And two, **your** activities, problems, and accomplishments may be news in themselves, helping other people in the industry.

To make it easy for you, we've prepared the card below. Just fill in any of the blanks which may be appropriate, drop it in an envelope, and airmail it to Communication Horizons, P. O. Box 1557, Oklahoma City 1, Oklahoma. Today is the day to do it!

Communication report for the period ____________ to ____________.

New personnel in period: ____________

New test equipment installed: ____________

New antennas installed: ____________

New mobile units installed: ____________

New base stations installed: ____________

New repeaters installed: ____________

New systems installed: ____________

Current problems: ____________

Plans for next 30 days: ____________

From: Firm: ____________

Location: ____________

Signed: ____________

Date: ____________

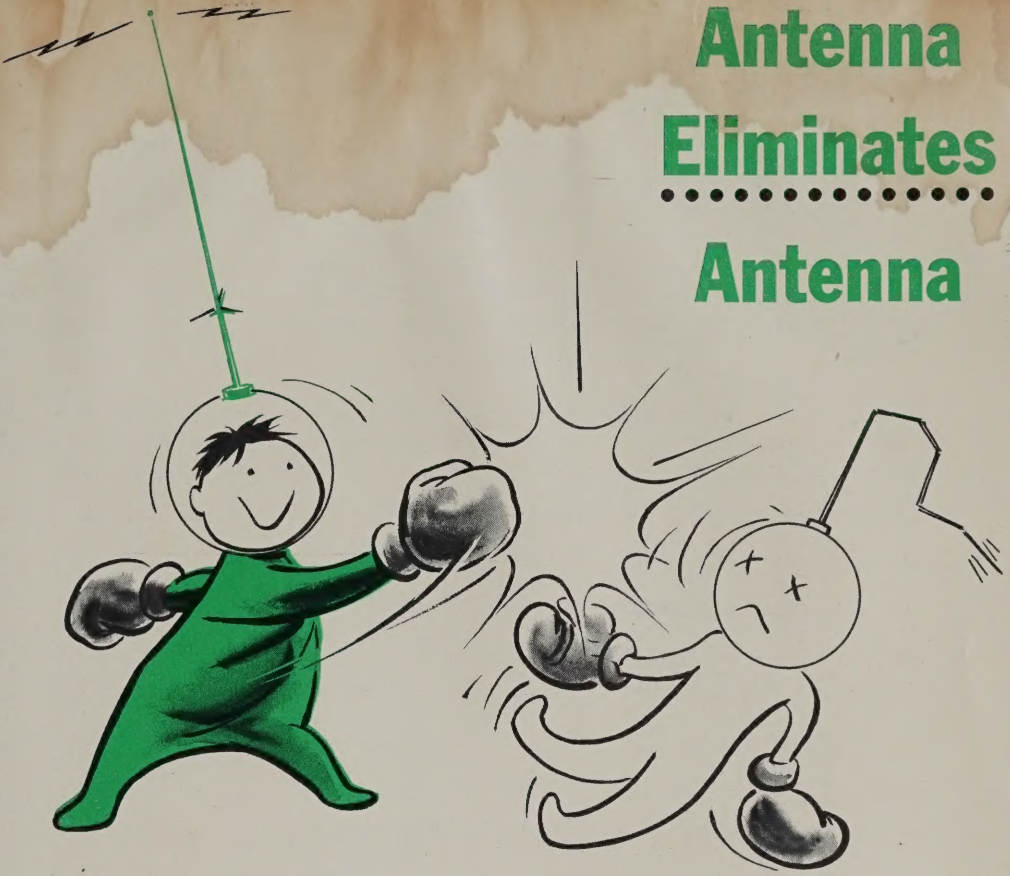
NEWS . . . on many fronts of the non-broadcast industry!

During the coming months, the non-broadcast radio industry is expecting to make news on many fronts. Not the least of these is the action to achieve an additional 240 channels of spectrum space by requesting reallocation of UHF TV channels 14 and 15. Technically, too, a number of newsbreaks are being anticipated.

Whatever the event — either technical or administrative — you can count on coverage in depth by the CH team. Washington Bureau Chief Bob Tall, Public Safety Contributing Editor Robert Brooking, Service Editor Kay Reed, and the rest of us here in the main office work around the clock with a single purpose in mind — to keep YOU informed of the latest events in the communication world.

But to keep informed, you must act as well. All our work goes for naught if you don't get an opportunity to read the result. And the way to make sure you have this opportunity is to make sure, today, that you're on our list of subscribers. Are you there? If not, turn the page, fill out the form, and airmail it right now. Speed pays! And then, for the next 12 to 15 months depending on how fast you act, you'll have all of us working for you — and you'll keep up with the news in COMMUNICATION HORIZONS.

Antenna Eliminates Antenna

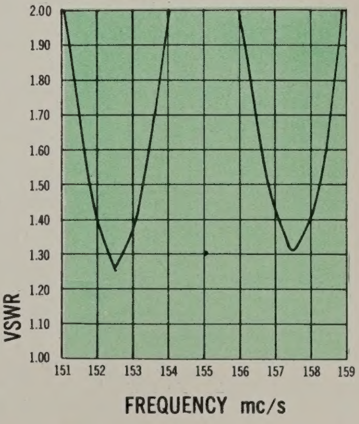


NOW! Get Optimum Two-Frequency Performance with ONE Antenna . . . the Prodelin OMNI-6 DD*

Here is an ideal antenna for Mobile Telephone Service, mobile repeat, or any full duplex or two-frequency application. Its unique double-dip resonance characteristic enables both receiver and transmitter to deliver optimum performance without compromise — making two separate antennas unnecessary.

The Omni-6 DD has a 5.8 db gain over a 1/2 wave dipole at two discrete frequencies with nominal 5 to 10 Mc/s spacing in the 144-174 Mc/s band. VSWR is 1.5:1 or less at **both** frequencies.

IMPEDENCE CURVE (Typical)



Write Dept. M for Catalogs	**598**—Omni-6 DD and 10 other 2-Way Antennas **603**—Microwave Parabolic Antennas and Accessories **595**—Rigid '800' Coaxial Transmission Line **591**—Spir-O-line and Spir-O-foam Semi-Flexible Coaxial Cables, and Spir-O-lok Connectors

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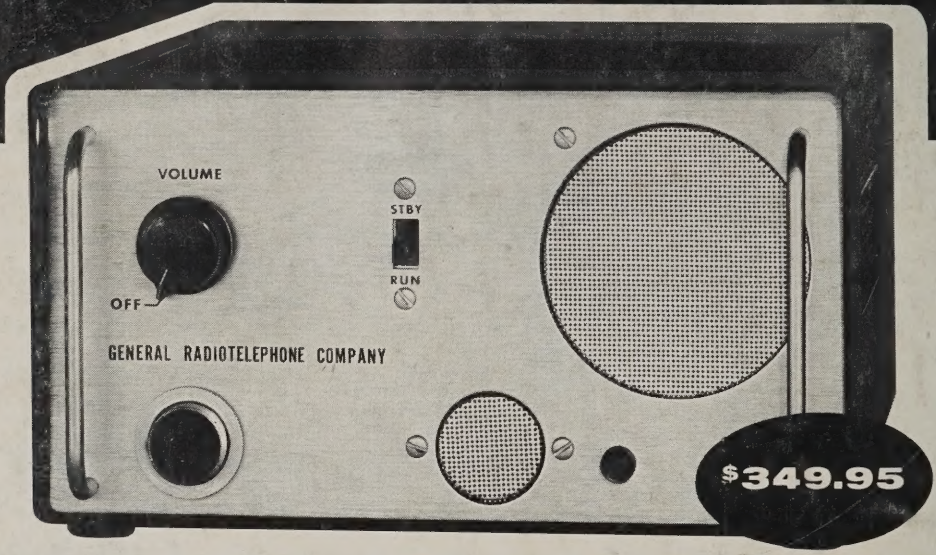
NEW . . . A Superior "Years Ahead Design"

150-174MC FM TRANSCEIVER

That Costs Less!

General FM-60

For New Split Channel Requirements



$349.95

The FM-60 Business Band Transceiver is the most competitive set available. The FM-60 now meets the complex demands placed upon modern business. This compact, rugged unit surpasses in quality, price and inclusive features any FM transceiver in operation today.

THE FM-60 is 60% efficient. This power ratio is unequaled in today's market.

THE FM-60, at $349.95, is up to 40% lower than competitive makes.

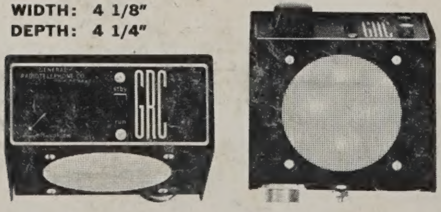
THE FM-60 has inclusive features that make for trouble-free, flexible two-way radio . . . hermetically sealed relays, nuvistor front end, fully automatic squelch, narrow band reception. Constructed for 6-12 or 115 volt input by merely changing the power cord. Handles are built-in to provide easy transport.

The FM-60 is a complete transmitting and receiving unit in itself. It may also be used with the RC-612 plug-in Remote Head.

MODEL RC-612 REMOTE CONTROL. The remote control, Model RC-612, is capable of controlling all functions of the FM-60, and contains a speaker; volume control with on-off switch; squelch control; battery saver switch, transmit and receive indicator lights; receptacle for microphone; 12 conductor remote cable with plug attached; mounting bracket.

Standard cable length is 17 feet, any length available on special order. **$49.95 NET**

HEIGHT: 1 13/16"
WIDTH: 4 1/8"
DEPTH: 4 1/4"



HIGHLIGHT SPECIFICATIONS: RECEIVER: Frequency Range: 150-174MC • Frequency Stability: .0005% temperature controlled • Squelch Sensitivity: .2uv or less • Attenuation of Spurious Response: Greater than 60 db • Receiver Sensitivity: .5 uv for 20db noise quieting • Intermediate Frequencies: 1st I.F. 11 MC 2nd I. F. 455KC • R.F. Amplifier: 6BS8 • 1st Mixer: 6CW4 • 1st and 2nd Oscillator: 6EA8 • 1st 455 KC I.F. Amplifier: 6BH6 • 2nd 455 KC I.F. Amplifier: 6BH6 • Limiter and Detector: 6BN6 • 1st Audio: ½ 6EB8 • Audio Amplifier: ½ 6EB8 • Noise Amplifier: ½ 6AW8 • TRANSMITTER: Frequency Stability: .0005% temperature controlled • Spurious and Harmonic Attenuation: Greater than 45 plus 10 Log 10 • R.F. Output Impedance: 50-74 ohms • R.F. Power output: 15 watts into 50 ohms • Modulation: FM (phase modulation) with direct crystal control. Type F3 emission • Modulation limiter: Automatic peak limiting • Modulation deviation: Narrow band (±5 KC) adjustable • Final amplifier: 6360 • 3rd Frequency multiplier: ½ 6360 • 2nd Frequency multiplier: ½ 6360 • 1st Frequency multiplier: ½ 6EA8 • Crystal Oscillator: ½ 6EA8 • Phase Modulator: 6BH6 • Microphone preamplifier: ½ 6AW8. POWER SUPPLY: Input voltages: 6 or 12 volts DC or 117 volts AC • Receive: 6V/9.4A, 12V/4.7A, 117V/60W • Transmit: 6V/16A, 12V/8A, 117V/100W • Duty cycle: Continuous, receive or transmit. SIZE: 4½H x 8 1/8W x 10½D. • Quick change "Snap-Rak" for instantaneous removal, optional. FCC type accepted, parts 10, 11, 16, 21, and certified under part 15.

The GENERAL FM-60, "Years Ahead Design," meets the recommended specifications established by the U.S. Government. It will exceed your expectations of what a trouble-free, reliable, low-cost FM Communications system can be. See for yourself!

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